III. CLAIM AMENDMENTS

1. (Currently Amended) A method for performing the operations for synchronizing a positioning receiver with a received code-modulated spread spectrum signal, the method comprising:

using at least one reference code, which reference code corresponds to a code used in the modulation, acquiring the frequency shift of the received signal and the code phase of the code used in the modulation,~~:~~

taking samples from the received signal for forming at least two~~the~~ sample vectors,

forming a first Fast Hartley transform on the basis of said reference code, and a second Fast Hartley transform on the basis of each sample vector,

performing a multiplication between the first Fast Hartley transform formed on the basis of said reference code and the second Fast Hartley transform formed on the basis of each sample vector,

performing an inverse Fast Hartley transform on each multiplication result, and

acquiring the frequency shift and code phase on the basis of the inverse Fast Hartley transforms of the multiplication results.

2. (Previously Presented) A method according to Claim 1, wherein the frequency range to be examined is specified, the specified frequency range is divided into two or more parts, whereupon said sample vector formation and correlation are performed on each part, the method also comprises an analysis,

in which values of the inverse Fast Hartley transforms of the multiplication results are saved for forming a coherent search matrix, the acquisition is performed after the examination of the specified frequency range, and the frequency shift and code phase are acquired on the basis of the highest value of the coherent search matrix.

3. (Previously Presented) A method according to Claim 2, wherein a threshold value is specified, and quantity values of the elements of the coherent search matrix that exceed said threshold value are used in the acquisition for acquiring the frequency shift and code phase.

4. (Previously Presented) A method according to Claim 2, wherein in said sample vector formation, correlation and analysis are repeated for forming at least two coherent search matrixes, and a summing is also performed in the method, in which summing an incoherent search matrix is formed by summing incoherently the values of the equivalent elements of the coherent search matrix formed at each time of repetition, and said incoherent search matrix is used in said acquisition for acquiring the frequency shift and code phase.

5. (Previously Presented) A method according to Claim 4, wherein the frequency range to be examined is specified, the specified frequency range is divided into two or more parts, whereupon said sample vector formation, correlation, analysis and summing are performed on each part, and values of the

elements of the incoherent search matrix are saved, and the acquisition is performed after the examination of the specified frequency range, and the frequency shift and code phase are acquired on the basis of the highest value.

6. (Previously Presented) A method according to Claim 4, wherein a threshold value is determined, and quantity values of the elements of the incoherent search matrix that exceed said threshold value are used in the acquisition for acquiring the frequency shift and code phase.

7. (Previously Presented) A method according to claim 1, wherein an inverse code corresponding to said reference code is used in the correlation to form the first Fast Hartley transform.

8. (Previously Presented) A method according to claim 1, wherein an inverse code corresponding to each sample vector is used in the correlation to form the second Fast Hartley transform.

9. (Currently Amended) A positioning system, which comprises at least a positioning receiver, synchronization means for performing synchronization operations to a received code-modulated spread spectrum signal, means for using at least one reference code in connection with the synchronization, which reference code corresponds to a code used in the modulation, and

means for acquiring the frequency shift of the received signal and the code phase of the code used in the modulation, wherein the synchronization means comprises:

- sample vector formation means for forming at least two sample vectors from the received signal,

- correlation means for forming a first Fast Hartley transform on the basis of said reference code, and for forming a second Fast Hartley transform on the basis of each sample vector, means for performing a multiplication between the first Fast Hartley transform formed on the basis of said reference code and the second Fast Hartley transform formed on the basis of each sample vector, and means for performing an inverse Fast Hartley transform on each multiplication result for forming a correlation function matrix, and

- acquisition means for acquiring the frequency shift and code phase by using the values of the inverse Fast Hartley transforms of the multiplication results.

10. (Previously Presented) A positioning system according to Claim 9, wherein the received signals are signals transmitted by satellites of the GPS system.

11. (Previously Presented) A positioning system according to Claim 9, which comprises a data transfer network, and at least part of the synchronization means are formed in connection with the data transfer network, and a data transfer connection is

arranged to be established between the data transfer network and the receiver.

12. (Previously Presented) A positioning system according to Claim 11, wherein the data transfer network comprises a mobile communication network.

13. (Previously Presented) A positioning system according to Claim 9, wherein the synchronization means are formed in the receiver.

14. (Currently Amended) A positioning receiver, which comprises at least synchronization means for performing synchronization operations to a received code-modulated spread spectrum signal, said receiver has means for using at least one reference code in connection with the synchronization, the reference code corresponding to a code used in the modulation, and means for acquiring the frequency shift of the received signal and the code phase of the code used in the modulation, the synchronization means comprising:

- sample vector formation means for forming at least two sample vectors from the received signal,

- correlation means for forming a first Fast Hartley transform on the basis of said reference code, and for forming a second Fast Hartley transform on the basis of each sample vector, means for performing a multiplication between the first Fast Hartley transform formed on the basis of said reference code and the

second Fast Hartley transform formed on the basis of each sample vector, and means for performing an inverse Fast Hartley transform on each multiplication result for forming a correlation function matrix, and

- acquisition means for acquiring the frequency shift and code phase by using the values of the inverse Fast Hartley transforms of the multiplication results.

15. (Previously Presented) A receiver according to Claim 14, further comprising:

- means for specifying the frequency range to be examined, means for dividing the specified frequency range into two or more parts, whereupon the formation of the sample vectors and the formation of the correlation function matrix are arranged to be performed for each part,

- means for forming a coherent search matrix,

- means for saving the values of the elements of the coherent search matrix, and

- means for determining the frequency shift and code phase on the basis of the highest value of the coherent search matrix.

16. (Previously Presented) A receiver according to Claim 14, further comprising means for specifying the threshold value, and means for comparing the values of said threshold value and the values of said coherent search matrix for determining the frequency shift and code phase.

17. (Previously Presented) A receiver according to Claim 14, wherein in said formation of sample vectors, formation of a correlation function matrix and formation of a coherent search matrix are arranged to be repeated at least two times for forming a coherent search matrix, and the receiver also comprises summing means for forming an incoherent search matrix by summing the values of the equivalent elements of the coherent search matrix formed at each time of repetition, and said incoherent search matrix is used in the acquisition step for determining the frequency shift and code phase.

18. (Previously Presented) A receiver according to Claim 14, further comprising:

- means for specifying the frequency range to be examined,
- means for dividing the specified frequency range into two or more parts, whereupon the formation of the sample vectors and the formation of the correlation function matrix are arranged to be performed for each part,
- means for forming a coherent search matrix,
- means for summing the coherent search matrix to the incoherent search matrix,
- means for saving the values of the elements of the incoherent search matrix, and
- means for determining the frequency shift and code phase on the basis of the highest value.

19. (Previously Presented) A receiver according to Claim 18, further comprising means for specifying the threshold value, and means for comparing the values of said threshold value and the values of said incoherent search matrix for determining the frequency shift and code phase.

20. (Previously Presented) A receiver according to claim 14, wherein the correlation means comprise means for forming a Fast Hartley transform of the inverse code corresponding to said reference code.

21. (Previously Presented) A receiver according to claim 14, wherein the correlation means comprise means for forming a Fast Hartley transform of the inverse code corresponding to each sample vector.

22. (Currently Amended) An electronic device, which comprises at least a location determination positioning receiver, synchronization means for performing synchronization operations of the location determination receiver to a transmitted code-modulated spread spectrum signal, and in which the location determination receiver includes means for using at least one reference code in connection with the synchronization, the reference code corresponds to a code used in the modulation, and the electronic device comprises means for determining the frequency shift of the transmitted signal and the code phase of

the code used in the modulation, wherein the synchronization means comprises:

- sample vector formation means for forming at least two sample vectors from the received signal,

- correlation means for forming a first Fast Hartley transform on the basis of said reference code, and for forming a second Fast Hartley transform on the basis of each sample vector, means for performing a multiplication between the first Fast Hartley transform formed on the basis of said reference code and the second Fast Hartley transform formed on the basis of each sample vector, and means for performing an inverse Fast Hartley transform on each multiplication result for forming a correlation function matrix, and

- acquisition means for acquiring the frequency shift and code phase by using the values of the inverse Fast Hartley transforms of the multiplication results.

23. (Previously Presented) An electronic device according to Claim 22, which comprises means for determining the location of the electronic device and means for saving the location information, wherein the electronic device also comprises means for specifying the frequency range to be examined, and means for selecting the starting frequency from said frequency range on the basis of the location information saved in the receiver.

24. (Previously Presented) An electronic device according to Claim 22, wherein the correlation means comprise means for

forming a Fast Hartley transform of the inverse code corresponding to said reference code.

25. (Previously Presented) An electronic device according to Claim 22, wherein the correlation means comprise means for forming a Fast Hartley transform of the inverse code corresponding to each sample vector.

26. (Currently Amended) An electronic device according to Claim 22, further comprising ~~it also comprises~~ means for performing data transfer operations.

27. (Previously Presented) An electronic device according to Claim 26, further comprising means for establishing a data transfer connection to a data transfer network, whereby the means for determining the location of the electronic device comprise means for transmitting information needed in the location determination to the data transfer network, and means for retrieving information used in the location determination from the data transfer network, whereby at least part of the location determination operations are arranged to be performed in the data transfer network.

28. (Previously Presented) An electronic device according to Claim 26, wherein the means for performing data transfer operations comprise means for performing mobile station operations.

29. (Currently Amended) An electronic device, which comprises at least a positioning receiver and which electronic device is intended for use in connection with a positioning system, which comprises synchronization means for performing synchronization operations of the receiver to a transmitted code-modulated spread spectrum signal, means for using at least one reference code in connection with the synchronization, the reference code corresponding to a code used in the modulation, means for determining the frequency shift of the transmitted signal and the code phase of the code used in the modulation, and a data transfer network, wherein the electronic device also comprises sample vector formation means for forming at least two sample vectors from the received signal, and transmission means for transmitting the sample vectors and time information to the data transfer network, and the positioning system also comprises:

- correlation means for forming a first Fast Hartley transform on the basis of said reference code, and for forming a second Fast Hartley transform on the basis of each sample vector, means for performing a multiplication between the first Fast Hartley transform formed on the basis of said reference code and the second Fast Hartley transform formed on the basis of each sample vector, and means for performing an inverse Fast Hartley transform on each multiplication result for forming a correlation function matrix, and

- acquisition means for acquiring the frequency shift and code phase by using the values of the inverse Fast Hartley transforms of the multiplication results.

30. (Previously Presented) An electronic device according to Claim 29, further comprising reception means for receiving information about the acquired frequency shift and code phase from the data transfer network.

31. (Previously Presented) An electronic device according to Claim 29, which is intended for use in connection with a positioning system, and which also comprises means for determining the location of an electronic device, and means for receiving location information from the data transfer network.

32. (Previously Presented) An electronic device according to Claim 29, wherein the means for performing data transfer operations comprise means for performing mobile station operations.

33. (New) A method for performing the operations for synchronizing a positioning receiver with a received code-modulated spread spectrum signal, the method comprising:

using at least one reference code, which reference code corresponds to a code used in the modulation,

acquiring the frequency shift of the received signal and the code phase of the code used in the modulation,

taking samples from the received signal for forming the sample vectors,

forming a first Fast Hartley transform on the basis of said reference code, and a second Fast Hartley transform on the basis of each sample vector,

performing a multiplication between the first Fast Hartley transform formed on the basis of said reference code and the second Fast Hartley transform formed on the basis of each sample vector,

performing an inverse Fast Hartley transform on each multiplication result, and

acquiring the frequency shift and code phase on the basis of the inverse Fast Hartley transforms of the multiplication results,

wherein in said sample vector formation, correlation and analysis are repeated for forming at least two coherent search matrixes, and a summing is also performed, in which summing an incoherent search matrix is formed by summing incoherently the values of the equivalent elements of the coherent search matrix formed at each time of repetition, and said incoherent search matrix is used in the acquisition for determining the frequency shift and code phase.

34. (New) A positioning receiver, which comprises at least synchronization means for performing synchronization operations to a received code-modulated spread spectrum signal, said receiver has means for using at least one reference code in connection with the synchronization, the reference code corresponding to a code used in the modulation, and means for acquiring the frequency shift of the received signal and the

code phase of the code used in the modulation, the synchronization means comprising:

- sample vector formation means for forming at least two sample vectors from the received signal,

- correlation means for forming a first Fast Hartley transform on the basis of said reference code, and for forming a second Fast Hartley transform on the basis of each sample vector, means for performing a multiplication between the first Fast Hartley transform formed on the basis of said reference code and the second Fast Hartley transform formed on the basis of each sample vector, and means for performing an inverse Fast Hartley transform on each multiplication result for forming a correlation function matrix, and

- acquisition means for acquiring the frequency shift and code phase by using the values of the inverse Fast Hartley transforms of the multiplication results,

wherein in said formation of sample vectors, formation of a correlation function matrix and formation of a coherent search matrix are arranged to be repeated at least two times for forming a coherent search matrix, and the receiver also comprises summing means for forming an incoherent search matrix by summing the values of the equivalent elements of the coherent search matrix formed at each time of repetition, and said incoherent search matrix is used in the acquisition for determining the frequency shift and code phase.